C·R·E·S

Center For Reproduction Of Endangered Species

1988/89 Winter Report

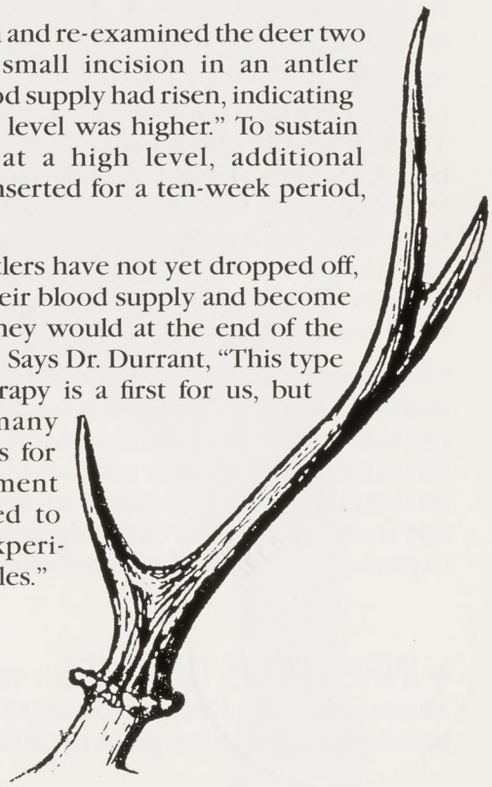
Editor: Judy Kinsell

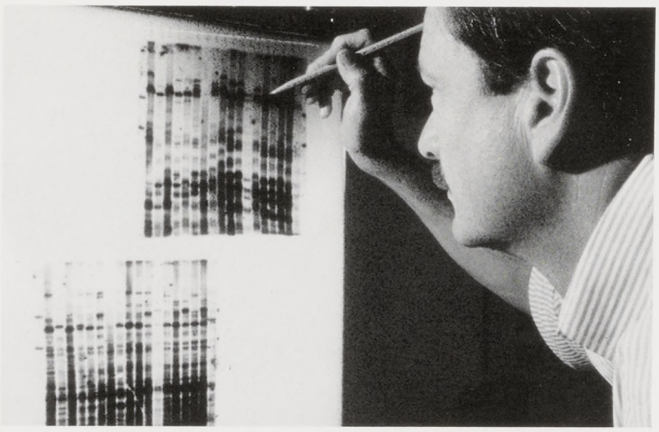
• REPRODUCTIVE PHYSIOLOGY Keepers at the Wild Animal Park became concerned when a male hog deer failed to lose his antlers. The animal had assumed a submissive role as the target of increased aggression by a male whose antlers had long since dropped off. Even more alarming was the possibility that continued bone growth at the base of the antlers could eventually push through the skull, and kill the animal.

CRES reproductive physiologist Dr. Barbara Durrant was called in on the case. After examining the hog deer she suspected it was not producing the male hormone testosterone in amounts sufficient for a normal antler cycle. "Normally, testosterone levels rise before breeding season," she explains. "Antlers grow and support velvet growth. When the hormone level peaks, velvet is shed, the animals clash for dominance, and rut. As the breeding season ends, testosterone levels drop sharply and the antlers fall off."

In an effort to restore the deer's normal cycle, Dr. Durrant simulated the hormonal pattern of the breeding season. "Because the testosterone level was extremely low, we placed hormone implants under the shoulder skin and re-examined the deer two weeks later. A small incision in an antler revealed the blood supply had risen, indicating the testosterone level was higher." To sustain the hormones at a high level, additional implants were inserted for a ten-week period, then removed.

Although the antlers have not yet dropped off, they have lost their blood supply and become hard, much as they would at the end of the breeding season. Says Dr. Durrant, "This type of hormone therapy is a first for us, but we're seeing many new applications for hormone treatment that can be used to help animals experience natural cycles."





• GENETICS For the first time, DNA fingerprinting—a technique used with humans to determine parentage or identify crime suspects—is being applied to endangered species research. Led by Dr. Oliver Ryder, CRES geneticists are adapting the technique to gain valuable information about the relationships of the 28 California condors in existence.

Knowing how closely related the condors are to one another is critical to the future of the species. Pairing birds that are too closely related could result in unsuccessful hatchings or offspring that have difficulty reproducing. The California Condor Recovery Team recommended that eight condors at the Wild Animal Park be paired for the 1988–89 breeding season, and that two males be sent to Los Angeles in exchange for a female. These decisions were made after carefully reviewing factors such as the birds' ages, behavioral data, and findings from the DNA fingerprinting analysis.

To make a genetic fingerprint, DNA is extracted from cells and cut with enzymes at certain positions. Through the use of probes, individual patterns become visible. The resulting genetic fingerprint looks somewhat like a bar code found on grocery store items. Because DNA bands are inherited, individuals who have more DNA bands in common are more likely to be related than those who do not. Yet each set of bands is unique, much like a fingerprint.

Says Dr. Ryder, "This technique is purported to be so powerful, some people think it feasible to sort out the relatedness of individuals in an entire population. At this point we can identify condors that are closely related and not closely related. It's uncertain territory, and we have to use our best judgment about the way to proceed. Nobody's done this before."

• INFECTIOUS DISEASES The Institute of Museum Services (IMS) has awarded a $25,000 matching conservation grant to CRES virologist Dr. Michael Worley, toward his study of the detection of a hepatitis B-like virus in black rhinoceroses. Dr. Worley launched the investigation when a number of North American zoos began to experience serious losses among black rhino populations. Currently, fewer than 90 of the animals live in captivity worldwide and less than 3,200 remain in the wild.

Dr. Worley's initial studies involved serum samples from 32 black rhinos from North American zoos. "Of those," he explains, "42 percent had antibodies that recognize a virus-protein related to the hepatitis B virus. These antibodies are most readily found in rhinos exposed to animals that have experienced a hemolytic event, resulting in death from hemolytic anemia."

Fatal hemolytic anemia has been documented in black rhinos with frightening persistence in recent years, and the cause remains unknown. But at the CRES virology lab, researchers are finding clues they hope will lead them to understand the cause of this disease syndrome. In the serum of an infected rhino, they recently discovered particles that closely resemble hepatitis B virus particles.

As efforts continue, Dr. Worley and his team plan to establish a link between a hepatitis B-like virus and the hemolytic syndrome in black rhinos. "If this can be accomplished," he says, "we will proceed to develop a means of rapid diagnosis and, hopefully, prevention of the virus infection."

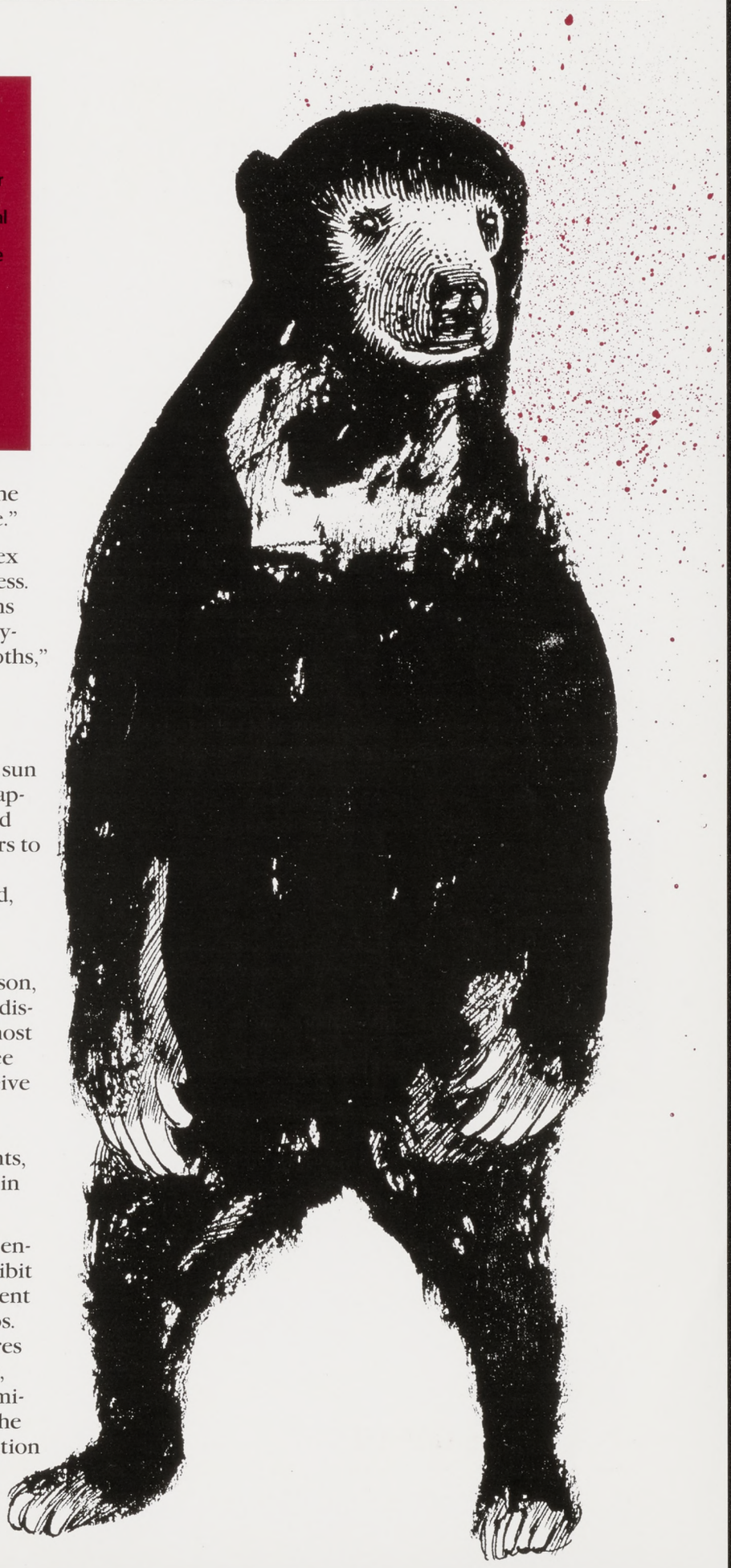
• ENDOCRINOLOGY In cooperation with the Burnett Park Zoo in Syracuse, New York, Dr. Arden Bercovitz is working to find a non-invasive way to detect pregnancy in the Hoffman's two-toed tree sloth. Dr. Bercovitz became involved in the study when he learned the species experienced an abnormally high rate of aborted pregnancies.

Officials at the Burnett Park Zoo believed the sloths would have a better chance of reproducing successfully if pregnancy could be determined early on. The sloth's gestation is unknown, but is estimated to be between eight and 14 months. The current method of pregnancy detection involves physically palpating the sloth's abdomen. The stress of normal handling and restraint is an obvious disadvantage of this procedure.

Over a period of two breeding seasons, Dr. Bercovitz measured sex steroid hormones from excretory samples of three pregnant and six non-pregnant females, and—as a basis for comparison—three males. "We measured androgens, estrogens and progesterone. Thus far, progesterone appears to be the best indicator of pregnancy. In most mammals, progesterone lev-

Led by Dr. Werner Heuschele, CRES scientists are making significant advances in wildlife research. But their goal of replenishing endangered animal populations cannot be met without the support of caring individuals.

For information on how you can help CRES, please call Amy Parrott at (619) 231-1515, extension 4249.



els rise throughout pregnancy, then rapidly decline after the birth. Sloths seem to fit the same scheme."

A complete profile and identification of specific sex steroids found in sloth excrement is still in progress. Dr. Bercovitz is evaluating data for all comparisons relevant to age, sex and stage of pregnancy. "Everything moves slowly when you're working with sloths," he says. "They give a new meaning to the word 'patience'."

• PATHOLOGY When Josephine, a Malayan sun bear, died last year at age 27, she was the oldest captive member of her species. Today, proper diet and good veterinary care make it possible for sun bears to live longer in captivity than in the wild. But like Josephine, bears who spend their later years in old, concrete exhibits are particularly susceptible to arthritis.

According to CRES pathologist Dr. Marilyn Anderson, arthritis often goes undetected in live bears. The disease can be insidious for many years, occurring most frequently in the spinal column, shoulder and knee joints. "If bones, muscles and tendons do not receive adequate exercise, they tend to weaken. Bones become thin, muscles shrink and tendons pull on weakened bones. This results in misshapened joints, fractures and abnormal knobby callus formations in and around joints."

Dr. Anderson believes that chronic arthritis is accentuated in aged captive bears because of small exhibit enclosures that discourage activity, and hard cement surfaces that result in a type of trauma to the limbs. Says Dr. Anderson, "Modern, naturalistic enclosures that provide a variety of substrates like dirt, rocks, trees and waterways should help to reduce or eliminate the onset of chronic arthritis." Exhibits like the Zoo's new sun bear habitat, scheduled for completion in June, will both stimulate activity and provide comfort for the animals in our care.

• BEHAVIOR

The cheetah breeding program at the Wild Animal Park celebrated a productive year in 1988, with the successful births of six healthy cubs from two litters. CRES behaviorist Dr. Donald Lindburg attributes the program's achievement to effective animal management.

"We know that mate selection is important to cheetahs," says Dr. Lindburg. "We've had females in estrus, but unwilling to mate with the male available. If you have the option of two, three or four males available, you can try them one by one until you get the right combination."

At the cheetah breeding facility, every attempt is made to meet the social, psychological and physical requirements of cheetahs by recreating their situation in the wild. "A recent recommendation by field biologists is that male litter mates be kept together for life," says Dr. Lindburg. "This gives them more confidence in breeding and greater success in holding territory. Another significant observation in the wild is that once a female leaves her litter group, she has almost no contact with other cheetahs except to mate and raise her babies."

Dr. Lindburg plans to incorporate these findings in his plan for 1989, grouping litter-mate males and completely isolating females. "There has long been a theory that familiarity between male and female cheetahs precludes their responding to each other as mates. We don't know how much contact represents familiarity. It could be that they have to live together for several months, or it could be just seeing and hearing each other from nearby pens. That's something we want to work on."

C·R·E·S

Center For Reproduction Of Endangered Species

Zoological Society Of San Diego
Development Department
Post Office Box 551
San Diego, California 92112

NON-PROFIT ORG.
U.S. POSTAGE
PAID
SAN DIEGO, CA
PERMIT NO. 410

• *The Center for Reproduction of Endangered Species (CRES) is operated by the Zoological Society of San Diego, a non-profit organization.*